The actuators 506_1-506_p comprise rotary devices, such as potentiometers or rotatable shaft encoders. One or more of these actuators can have a dedicated function irrespective of the execution of a current S-MEM. Others of the actuators 506_1-506_p can control a function associated with one or more devices in the context of a particular S-MEM, whereas, in the context of a different S-MEM, the actuators will control a different function associated with the same or different devices.

Like each of actuators 502_1-502_z, each of actuators 508_1-508_c typically comprises a push button. As compared to the push buttons 502_1-502_z, the majority of which are context dependent, the majority of the push buttons 508_1-508_c have dedicated roles, e.g., accomplishing "preview", "next page", "cut", and "transmit" operations to name but a few.

The Actuator 510 comprises a joystick, the function of which is typically context dependent. Thus, depending on the execution of a particular S-MEM, the joystick 510 could serve to pan and tilt a first television camera, whereas in the context of another S-MEM, the joystick could operate a video replay device.

Lastly, the control panel 302 can include a plurality of audio level monitors 512_1-512_j where j is an integer greater than zero. Each of the audio level monitors provides an indication, typically by means of a bar indicator, of the level of a particular audio device, such as a microphone, for example, in the context of a particular S-MEM. Thus for example, in connection with a particular S-MEM, a given one of the audio level monitors will indicate the audio level of a particular microphone, while in connection with a different S-MEM, the same audio indicator will indicate the level of a different microphone.

In practice, each of audio level monitors 512_1-512_j lies aligned with a corresponding one of the faders 504_2-504_z. To the extent that a particular one of the faders 504_2-504_z controls a particular audio device, such as a microphone, in connection with a particular S-MEM, the audio level monitor aligned with that fader will indicate the level of that controlled device.

FIGURE 7 depicts a electrical block diagram of the control panel 302 of FIG 4. A single board microcomputer 600 serves as the controller for the control panel 302. The microcomputer 600 has address, data, and control busses, through which the microcomputer connects to a Random Access Memory 602, a Flash Memory 604, and a mass storage device 606, typically in the form of a magnetic hard disk drive. In practice, the hard disk drive 606 will contain program instructions, whereas the flash memory 604 can contain a basic input/output operating system (BIOS). The microcomputer 600 has interfaces 608 and 610

ABSTRACT OF THE DISCLOSURE

A television production system (300) affords simplification over the automation of a television program such as a news program by making use of State Memory Objects (S-MEMs), each defining one or more operations for execution by one or more production devices. The S-MEMS serve to control one or more actuators on a control panel (302) so that each actuator on the control panel can control different function of different pieces of production equipment depending on the S-MEM selected, and the actuator manifests a status of the production device.

source material (video, audio, etc.) having a fixed run-time.

However, for a segment that involves live talent, use of an approximate duration is preferred. The approximate duration aids in predicting the run time of the show, but the progression to the subsequent event will always requires manual initiation to accommodate the timing variations that are inherent in the use of live talent.

FIGURE 3 depicts a block schematic diagram of a television production system 300 embodying the present principles for enabling automated production of a television program, such as a television news program. At the heart of the system 300 lies a context-sensitive control panel 302 described in greater detail in FIG. 4, for allowing the director 18 individually to control multiple production devices by the use of S-MEM as discussed above. Such production devices can include one or more video playout devices, such as a server 305 comprising part of an existing Digital News Production System 306. Other devices controlled via the control panel 302 can include one or more television cameras 306, associated camera robotics 308, a character generator 310, and a still store 312 for storing still video images.

Video signals from the cameras 306, the character generator 310, and the still store 312 pass to a video switcher 313 that selectively switches among input signals under the control of the control panel 302. In the illustrated embodiment, the switcher 313 can to perform various digital video effects, obviating the need for a standalone DVE device. However, the system 300 could include one or more separate DVEs (not shown). The switcher 313 provides both a video program output for transmission and/or recording, as well as a preview output for receipt by a preview monitor (not shown). While not illustrated, the video switcher 313 can also receive video from one or more devices, such as videotape recorders, video cartridge machines, and/or satellite receivers, to name but a few.

The control panel 302 also controls an audio mixer 314 that receives audio input signals from a digital cart machine 316 as well as one or more studio microphones 318. Further, the audio mixer 314 can receive input signals from one or more devices, such as the playback server 304, as well as one or more audio tape recorders (not shown) and/or one or more satellite receivers (not shown). The audio mixer 314 provides a program audio output, as well as an intercom output and an output for audio monitoring, by way of a monitor speaker or the like (not shown).

for transmission often proves problematical. Selecting among the many individual operations of each of the various pieces of production equipment takes significant time, making programming an arduous task.

In practice, the change from one program segment to the next will typically require simultaneous or closely coordinated changes in many of the controlled devices. Advantageously, the system of Holtz et al provides one or more Graphical User Interfaces (GUIs) for controlling one or more devices, obviating the need to provide large and complex control panels that are normally used to control devices such as video switchers, audio mixers, and digital effects devices. However, this approach also incurs limitations. GUIs do not always constitute the preferred user interface for adjusting critical controls. Many operations, particularly on video equipment, require that the operator view the result of control adjustment on a video screen, while adjusting the control, but operation of the GUI frequently requires that the operator look at the GUI rather than the video image. There are many other circumstances where the "feel" of a physical control is preferred to use of a GUI.

Within the Holtz et al system, all dynamic transitions, such as video wipes, audio fades, etc., require pre-programming under the control of the program timer. However, to achieve a high quality television production, sometimes, the operator will need to change the speed of such a transition, or slightly offset the video and audio transitions. Such a refinement can occur only if the operator has access to the physical controls of the various pieces of production equipment during production. However, as discussed above, the physical control panels normally supplied with such equipments are large and complex, and it is not generally practical for a single person to be responsible for operation of an array of such control panels. The drawbacks associated with present day production equipment, as discussed above, typically preclude a single operator from handling all of the controls of an array of control panels needed to effect the desired offset.

International Patent Publication WO 99/0581 describes a machine control system for controlling various pieces of equipment for producing a television news broadcast. The system includes a director work station connects to a server linked to one or more external production devices. A director uses the work station by selecting one or more events, causing the server to communicate information to the production devices to execute such events. A graphical user interface provides a display of the status of the various production devices. The ma

hine control system of WO 99/0581, like that of the system of Holtz et al. also suffers from the disadvantage of precluding a single operator from handling all of the controls of an array of control panels needed to effect the desired offset

Thus, a need exists for a television production technique that overcomes the aforementioned disadvantages.